JAN MCLIN CLAYBERG
PATENT AND TECHNICAL TRANSLATION

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ACCREDITED BY AMERICAN TRANSLATORS ASSOCIATION
* GERMAN AND FRENCH TO ENGLISH
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DECLARATION

The undersigned, Olaf Bexhoeft, hereby states that he is well acquainted with both the English and German languages and that the attached is a true translation to the best of his knowledge and ability of the German text of PCT/DE2003/002597, filed on 08/01/2003, and published on 03/25/2004 under No. WO 2004/024229 A1.

The undersigned further declares that the above statement is true; and further, that this statement was made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or document or any patent resulting therefrom.

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Specification

Devices ~~for Maintaining at Least~~ One Lift Device on a Cylinder of a Rotary Press and Method for Mounting Said Devices

The invention relates to devices for holding at least one dressing on a cylinder of a rotary printing press, and to a method for mounting these devices, in accordance with the preambles of claims 1, 2, 9, 10 or 38.

A device for fastening a dressing to be applied on a cylinder, which is arranged in a channel of a cylinder of a rotary printing press, is known from DE 100 58 996 C1, wherein the device has a one-armed lever and a spring, and the lever has a pivot axis which is fixed in place in respect to the cylinder, wherein the spring is clamped between a wall of the channel and the lever. The channel has an opening, and the lever and the spring are arranged in a base body, wherein the base body is embodied as a tube corresponding to the cross section of the channel, and wherein the lever is pivotably seated in the area of a wall of the base body located opposite the opening of the channel.

In Fig. 2, the associated WO 02/43982 A2 discloses a device for fastening a dressing to be applied on the cylinder, wherein the lever is pivotably seated in a groove cut into the wall of channel wherein, however, the device does not have a base body.

A method and a device for clamping and releasing flexible plates is known from DE 199 24 787 A1, wherein the device is enclosed in a base body arranged in a channel of the cylinder of a printing press. Clamping elements of the

device are pivotably seated in supports, wherein the supports are embodied as slits in the base body, which are engaged by lower ends of the clamping elements. Moreover, the cross section of the channel is matched to the cross section of the base body shaped in the form of a groove.

The object of the invention is based on creating devices for holding at least one dressing on a cylinder of a rotary printing press, and a method for mounting these devices.

In accordance with the invention, this object is attained by means of the characteristics of claim 1, 2, 9, 10 or 38.

The advantages to be gained by means of the invention consist in particular in that the device for fastening a dressing on a cylinder of a rotary printing press, which consists of a one-armed lever and a spring, constitutes a structural component which can be easily mounted in a channel of a cylinder, wherein this structural component can be produced in a cost-effective manner. Thus, the attainment of the object in accordance with the invention has the advantage that a base body, which encloses a large portion of the holding means, is not required, which already means a savings in material, and therefore lowered costs. Devices of the species in accordance with the prior art show tube-shaped bodies which, for all practical purposes, are fitted with their entire surface facing the wall of the channel wherein, for an exact fit between the channel and the base body, considerably higher demands are made on production technology than in connection with a bow in accordance with the invention which, because of its shape, merely needs to be

inserted into the channel, and for which a single individual support point is sufficient for performing its function. Advantages in mounting the device result because the bow is attached to the holding means, instead of the holding means being loosely placed into the channel. It is particularly advantageous that the bow fixes the holding means in place on its support point, so that the holding means are secured against being unintentionally released from its operating position, and the device as a whole is simultaneously arranged in the channel fixed against relative rotation. When employing a tube-shaped base body it is necessary to take additional steps for fixing it in place secure against relative rotation. Moreover, the spring which spreads open the bow and the holding means can be safely fixed in place at least at one of its ends, which also constitutes an assembly advantage. The spring is linearly guided and is therefore protected against breaking out laterally. By means of a stop provided between the bow and the holding means the spring is prevented from being compressed into a block, in which case the spring would attempt to yield laterally. Also, the stop advantageously prevents the holding means from jamming an end of the dressing suspended by its leading edge in the production direction of the cylinder, which would hamper the removal of a dressing wound on the cylinder.

Exemplary embodiments of the invention are represented in the drawings and will be described in greater detail in what follows.

Shown are in:

Fig. 1, a sectional representation of a device for holding a dressing to be applied on a cylinder,

Fig. 2, a perspective representation of the bow,

Fig. 3, a planar developed view of the legs of the bow,

Fig. 4, a helical spring pushed onto a tongue and with its last winding pulled in,

Fig. 5, a sectional representation of a tongue with a sleeve and a spring,

Fig. 6, a perspective representation of the sleeve,

Fig. 7, a further sectional representation of a device for holding a dressing to be applied on a cylinder,

Fig. 8, a perspective representation of elements of the device in accordance with Fig. 7.

In accordance with an embodiment variation represented in Fig. 1, a dressing 03, for example a flexible plate-shaped printing forme 03, is fastened on the surface area 02 of a cylinder 01 by inserting legs 04, 06, which are beveled off on the ends of the dressing 03, into a channel 07, which is arranged in the cylinder 01 and has an opening 11 oriented towards the surface area 02 of the cylinder 01 and has been placed there substantially against the walls 08, 09 of the opening 11 which are close to the surface area. The legs 04, 06 can also rest in part against the wall 12 of the channel 07 which is located deeper in the interior of the cylinder 01, because the border between the walls 08, 09 of the opening 11 and the wall 12 of the channel 07 extends fluidly. By pointing this out it is only intended to suggest that the insertion depth of the legs 04, 06 is not exactly fixed, but instead encompasses an extended tolerance range. Without having any effect on the invention, the channel 07 can have various cross-sectional geometries, however - as represented

in Fig. 1 -, a circular cross section is advantageous from the viewpoint of production technology.

Without limiting the invention to the following simplified representation, for the sake of clarity the representation of the invention takes place here in a way as if only a single dressing 03, which is wrapped around the cylinder 01, were to be fastened on the cylinder 01. It is easily comprehensible for one skilled in the art that several dressings could be fastened in accordance with the invention here described on the cylinder 01 in its axial direction, as well as in its circumferential direction wherein, however, in the case of several dressings, several channels would also have to be provided in the circumferential direction.

Viewed in the production direction P, the dressing 03 to be fastened on the cylinder 01 has a leading end 13 and a trailing end 14, each with beveled-off legs 04, 06. Viewed in the production direction P of the cylinder 01, the opening 11 of the channel 07 also has a front edge 16, from where a wall 08 extends toward the channel 07, wherein this wall 08 is also called a first wall 08, as well as a rear edge 17, from where a wall 09 also extends toward the channel 07, wherein this wall 09 is called the second wall 09. The opening 11 extends long and narrow on the surface area 02 of the cylinder 01 and is therefore embodied to be slit-shaped, wherein the slit width S in comparison with the depth t of the channel 07, which can be for example 28 mm to 35 mm, preferably 30 mm, is small and has such dimensions that a leg 04 of a leading end 13 of a dressing 03 and a leg 06 of the trailing end 14 thereof, or -in case of several dressings 03

fastened in the circumferential direction of the cylinder 01 - that of an identical dressing 03 can be arranged one behind the other in the opening 11. Slit widths S of less than 5 mm, preferably in the range between 1 mm and 3 mm, are advantageous. Therefore the ratio of the depth t of the channel 07 and the slit width S lies approximately at 10:1.

An acute angle α, which lies between 40° and 50°, preferably 45°, is formed between the front wall 08 extending from the front edge 16 in the direction toward the channel 07 and an imagined tangential line T resting on the opening 11 in the surface area 02 of the cylinder 01. Thus, the slit width S of the opening 11 tapers in the direction toward the surface area 02 of the cylinder 01, and increases in the direction toward the channel 07. The leg 04 of the leading end 13 of the dressing 03 can be suspended at the front edge 16 of the opening 11, so that this leg 04 rests, preferably in a positively connected manner, against the wall 08 extending from the front edge 16 toward the channel 07. In the example represented in Fig. 1, the wall 09 drops approximately vertically from the rear edge 17 of the opening 11 in the direction toward the channel 07. However, the wall 09 can also be slightly inclined, so that the opening 11 widens in the direction toward the channel 07. An angle ß, which results as the opening angle between the wall 09 extending from the rear edge 17 toward the channel 07 and the already mentioned tangential line T resting on the opening 11 in the surface area 02 of the cylinder 01, lies for example within the range of 85° to 95°, and is preferably 90°.

As a rule, the channel 07 extends axis-parallel with the cylinder 01, for example over its entire length. A

recess 18, for example a groove 18, is located in the wall 12 of the channel 07, preferably approximately diametrically opposite the slit-shaped opening 11, in which a, for example dimensionally-stable, torsion-resistant, preferably plate-shaped holding means 19 is placed - preferably loosely - and pivotably seated. The holding means 19 can be, for example, a metallic strip extending linearly in the channel 07, which is preferably seated in or on the bottom of the channel 07. Therefore the groove 18 is a seating point and support point of the holding means 19 designed as a lever. In order to be able to pivot the holding means 19 in the groove 18, the width B of the groove 18 is designed to be greater than the thickness D of the holding means 19. The holding means 19 is designed in such a way that it has a first, upper end 21, which can be placed against one of the two walls 08 or 09 of the opening 11, and a second, lower end 22 located opposite the opening 11, wherein this lower end 22 is supported in the groove 18. Alternatively to the groove 18 in the wall 12 of the channel 07, a holder can be provided in the interior of the channel 07 near the wall 12 of the latter, in which the holding means 19 is pivotable seated. Thus, by means of its arrangement and shape, the holding means 10 divides the cross section of the channel 07 into two section.

A dimensionally-stable bow 23 with one or several edges 32, 33 is provided in the channel 07. The bow 23 has two ends, wherein a first, lower leg 26, for example, is oriented from a first edge 32 to an end of the bow 23, and a second upper leg 27 from a second edge 33 to another end of the bow 23. Thus, the bow 23 is preferably embodied as a polygon and has a substantially semi-circular U- or L-shaped cross

section, wherein the bow 23 is arranged in the channel 07, preferably preponderantely only on one side of the holding means 19, namely on that side which faces the wall 08 of the opening 11 extending at the acute angle α toward the channel 07. In this case the bow 23 is advantageously oriented from the second lower end 22 of the holding means 19 to its first upper end 21 wherein, in a preferred embodiment, one end of the bow 23 extends as far as the wall 08 of the opening 11 which extends toward the channel 07 at the acute angle α. The bow 23 is embodied, for example, as a component punched out and bent from sheet metal and can possibly have several bends. Alternatively, the bow 23 can be a molded element made of plastic. For seating it in the channel 07, suitable support points have been formed on the bow 23, for example sharp or rounded edges or flat partial surfaces which are small in comparison with the entire surface of the bow 23. In case of a metallic bow 23, the edges 32, 33 constitute bent edges 32, 33, for example.

The lower leg 26 of the bow 23 is preferably attached to the lower end 22 of the holding means 19. The attachment of the lower leg 26 at the lower end 22 of the holding means 19 can be performed, for example, in that at least one opening, for example a bore or a punched-out section, in particular a T-shaped punched-out section, has been applied in the lower end 22 of the holding means 19, in which at least one tongue 28 formed at the lower leg 26 (Figs. 2 and 3), in particular a tongue 28 embodied in a T-shape, can be suspended. A T-shaped embodiment of the punched-out section in the holding means 19 and of the tongue 28 has the advantage that a tongue 28 suspended in the holding means 19

can be fixed in place. At least one tongue 29 - however, preferably several identical tongues 29 - oriented toward the first end 21 of the holding means 19 are also formed on the upper leg 27 of the bow 23, on each of which a spring 31, preferably a helical spring 31, has been placed. The bow 23 is supported in the channel 07 on individual, i.e. spaced apart, support points, preferably at three support points, wherein one support point is located on the wall 12 of the channel 07 in the (upper) channel half facing the opening 07 or, in particular, on the wall 08 of the opening 11, which extends at an acute angle α toward the channel 07.

Fig. 1 shows a bow 23 which is supported at individual support points and thus does not rest over its entire surface against the wall 12 of the channel 07. The bow 23 is supported by its second upper leg 27 on the wall 08 of the opening 11, which extends at an acute angle α toward the channel 07, and by an edge 32 on the wall 12 of the channel 07. Further support points are provided by the front faces of a helical spring 31 arranged between the second upper leg 27 of the bow 23 and the first upper end 21 of the holding means 19, as well as by an attachment of the first lower leg 26 of the bow 23 at the second lower end 22 of the holding means 19. In a preferred embodiment the support point of the bow 23 at the second lower end 22 of the holding means 19 is spaced apart from the seating and center point of the holding means 19 by a distance a, wherein the distance a is a few millimeters, preferably between 1 mm and 3 mm. The support point of the bow 23 with the edge 32 at the wall 12 of the channel 07 represented in Fig. 1 is optional, because three support points are sufficient for the secure seating of the

bow 23 in the channel 07. Use of the support point on the wall 08 of the opening 11, which extends at an acute angle α toward the channel 07, offers the advantage of fixing the holding means 19 in its seating and center point by means of the bow 23. Here, the seating of the bow 23 in the channel 07 is disengaged from a pivot movement of the holding means 19.

The spring 31, which has preferably been placed on the tongue 29, is pre-stressed and spreads the bow 23 and the holding means 19 apart. Therefore the spring 31 is supported at one end on the bow 23 and on its other end on the holding means 19, preferably close to the upper end 21 of the holding means 19, so that the holding means 19 acting as a lever forms as long a lever arm as possible between its seating point in the groove 18 up to the spring 31. The support of the spring 31 on the bow 23 can be aided by one or several strips 34 (Figs. 2 and 3) formed on the side of the tongue 29, or by an appropriately embodied stop-like collar 34. The bent edge 33 of the bow 23, or its upper leg 27, are advantageously supported near or on the wall 08 extending from the front edge 16 toward the channel 07. The force exerted by the spring 31, which is arranged between the bow 23 and the holding means 19, on the bow 23, as well as on th holding means 19, together with the support of the bow 23 on the wall 08 of the opening 11, which extends at an acute angle α toward the channel 07, aids the fixation in place of the holding means 19 in its seating and center point in the groove 18. The upper end 21 of the holding means 19 is also simultaneously pushed against the wall 09 extending toward the rear edge 17 of the opening 11, from which a clamping

point results at the upper edge 21 of the holding means 19, which is used for fastening of a leg 06 of a dressing 03 suspended there.

The holding means 19, the bow 23 and the spring 31 constitute a structural unit, which can be mounted in a simple manner in a channel 07 of the cylinder 01, preferably by being laterally inserted into the channel 07. Therefore a method for mounting a cylinder 01 of a rotary printing press with a device for fastening at least one dressing 03 on the cylinder 01, wherein the device is arranged in a channel 07 of the cylinder 01, is substantially distinguished by the process steps wherein a spring 31 is placed on an upper leg 27 of a bow 23, a lower leg 26 of the bow 23 is movably attached to a lower end 22 of a holding means 19, and the holding means 19, together with the bow 23 and the spring 31 are introduced into the channel 07. Moreover, in connection with this method a support 37 of an actuating means 36, which is used for actuating the holding means 19, can be movably attached to the holding means 19 prior to the insertion of the holding means 19 into the channel 07. By their combined effects, the holding means 19, the bow 23 and the spring 31 constitute a device, which is effective in the channel 07, for fastening a dressing 03 to be placed on a cylinder 01 of a rotary printing press.

The actuating means 36 counteracts the contact pressure exerted by the spring 31 via the holding means 19 on the wall 09 extending from the rear edge 17 of the opening 11 in order to release, when required, the clamping caused by the holding means 19 at the wall 09 during an actuation of the actuating means 36. The actuating means 36 preferably is a hose 36

extending in the longitudinal direction of the channel 07, which can be charged with a pressure medium, for example compressed air, and which can be enclosed in a support 37. The support 37 of this actuating means 36 can be a sheet metal element bent in a U-shape, for example, which is supported on the wall 12 of the channel 07 and which, by its shape, reduces the increase in volume of the hose 36 required for releasing the clamping and in this way contributes to a shorter reaction time of the actuating means 36. The support 37 can also be suspended by means of a tongue formed on the support 37 in at least one opening of the holding means 19, for example in a bore or a punched-out section. This suspension of the support 37 can also take place in the same, correspondingly larger embodied, opening of the holding means 19, for example, in which the lower leg 26 of the bow 23 is also suspended, so that the tongue of the support and the tongue 28 on the lower leg 26 of the bow 23 come to rest on each other. As with the suspension of the bow 23, a support 37 suspended from the holding means 19 should also remain movable transversely in respect to the holding means 19 in order to be able to support the support 37 on the wall 12 of the channel 07, at least during the actuation of the actuating means 36. Embodiments can also be advantageous, wherein the actuating means 36 and its support 37 are embodied as a single component, wherein a hollow body, which is designed to be reversibly deformable, for example a hose which can be charged with a pressure medium, is reinforced, in addition to the side facing the holding means 19, for example by being extrusion-coated with plastic, wherein at least one, preferably metallic, tongue for the suspension of

the support 37, whose material is incorporated into the material of the actuating means 36, in an opening of the holding means 19, has been introduced into this reinforced outer wall of the actuating means 36. With a different realization of the actuating means 36, a support 37 in the form herein described may be unnecessary. A further embodiment variation provides the embodiment of the support 37 in the form of a strip extending in the axial direction over the entire length of the channel, wherein the support is fastened, for example by a screw connection, on the front faces of the cylinder. In this case the strip is advantageously embodied in such a way that it can be threaded into the channel 07 through the slit-shaped opening 11, or can be moved out of it by a rotary movement around an axis parallel with the cylinder.

Fig. 4 shows an advantageous design of the spring 31 which is placed on the tongue 29 formed on the upper leg 27 of the bow 23. For being fixed in place on the tongue 29, in this example the spring 31 has a pulled-in last winding, with which the spring 31 is matched to the width b of the tongue 29 and can be placed on the tongue 29 by means of a press fit. The width b of the tongue 29 may be, for example, 3 mm to 10 mm, preferably 5 mm. The length l of the tongue 29 can lie between 6 mm and 15 mm, for example. The interior diameter d of a spring 31 with a pulled-in last winding widens over the length l of the tongue 29, wherein the interior diameter d at the end, with which the spring 31 is supported on the holding means 19 is, for example, approximately 1 mm greater than the width b of the tongue 29. Therefore the rise of the spring 31 is unimpeded. In a

preferred embodiment the front face 38 of the tongue 29 is used as a stop 38 for limiting a pivoting movement of the holding means 19 between the bow 23 and the holding means 19, wherein the pivoting movement of the holding means 19 is oriented toward the bow 23. The stop 38 prevents the helical spring 31 arranged between the bow 23 and the holding means 19 from being compressed into a block.

A further embodiment of the arrangement of the spring 31 on the tongue 29 is shown in Figs. 5 and 6. A sleeve 39, which is preferably made of plastic, has a bore 41 or a blind bore 41, by means of which the sleeve 39 can be pushed onto the tongue 29. Alternatively, such a sleeve 39 can be applied directly to the upper leg 27 of the bow 23, which has been shaped to match. The spring 31 itself is pushed onto the sleeve 39. The front face of the sleeve 39 in turn limits the lift of the spring 31.

A further variation of the proposed device is represented in Fig. 7. The bow 23, in particular a dimensionally-stable bow 23 made of a metallic material, is supported for one near one of its ends at the wall 08 of the opening 11, which extends at an acute angle α toward the channel 07, and also with its other end at the second lower end 22 of the holding means 19. A spring 31, arranged between the bow 23 and the holding means 19 substantially parallel with a tangential line T resting on the opening 11, spreads the bow 23 and the holding means 19 apart, so that the spring 31 exerts a force on the respective support points of the bow 23 and contributes to fixing the holding means 19 in place in its seating and centering point in the groove 18. The spring 31 is preferably designed as a helical spring 31.

For the sake of clarity, the spring 31 is represented in Fig. 7 with an interrupted winding. The spring 31 has been placed on a peg 43, wherein the peg 29 is preferably formed on a plate 42, and the plate 42 is attached to the side of the holding means 19 facing away from the bow 23.

Fig. 8 shows further details in this connection. For example, the holding means 19 has at least one opening 44, but advantageously a plurality of openings 44, into which a peg 43 attached to the plate 42, for example formed on it, can be clipped. The plate 42 is fastened to the holding means 19 by the pegs 43 clipped into the openings 44. The spring 31 has been advantageously pushed onto at least one of the pegs 43. On its one end, by means of which it is attached to the holding element 19, the bow 23 advantageously has a tongue 28 embodied in a T-shape, which is suspended in an opening, preferably also embodied in a T-shape, of the holding means 19. This design of the tongue 28 and the opening in the holding means 19 permits a rotatorily movable seating of the bow 23 on the holding means 19, but they also secure the bow 23 against an unintentional removal from the holding means 19. By means of the rotatorily movable seating with generous play of the bow 23 in the holding means 19, the bow 23 remains unaffected to a large extent by a pivot movement of the holding means 19. Advantageously the plate 42 attached to the holding means 19 is designed in such a way that, following its attachment to the holding means 19, it covers the opening, embodied in a T-shape, in the holding means 19 to such an extent, that the tongue 23, which is embodied in a T-shape, on the bow 23 can no longer be removed from the holding means 19. In this way the plate 42

additionally secures the bow 23 against unintentional removal from the holding means 19. The plate 42 can be made of a plastic material, for example. In the course of its actuation, the actuating means 36 arranged in the channel 07 exerts a force on a support 37, which is fixed in place in the channel 07 and is preferably embodied in the shape of a shell, as well as on the plate 42 attached to the holding means 19. The support 37 is embodied, for example, as a strip fastened to the front faces of the cylinder 01.

From the support point of the bow 23 on the wall 08 of the opening 11, which extends at an acute angle α toward the channel 07, a leg 27 of the bow 23 is oriented toward the holding means. In this example the front face 38 of the leg 27 constitutes a stop 38, against which the holding means 19 strike during a pivot movement triggered by the actuating means 36 and directed toward the bow 23.

List of Reference Symbols

01	Cylinder
02	Surface area
03	Dressing, printing forme
04	Leg
05	-
06	Leg
07	Channel
08	Wall, first
09	Second wall
10	-
11	Opening
12	Wall
13	End, leading
14	End, trailing
15	-
16	Edge, front
17	Edge, rear
18	Recess, groove
19	Holding means, lever
20	-
21	End, first, upper
22	End, second, lower
23	Bow
24	-
25	-
26	Leg, first, lower
27	Leg, second, upper

28	Tongue
29	Tongue
30	-
31	Spring, helical spring
32	Edge, bent edge
33	Edge, bent edge
34	Strip, collar
35	-
36	Actuating means, hose
37	Support
38	Stop, front face
39	Sleeve
40	-
41	Bore, blind bore
42	Plate
43	Peg
44	Opening

B	Width
D	Thickness
P	Production direction
S	Slit width
T	Tangent line

a	Distance
b	Width
d	Interior diameter
l	Length
t	Depth

α	Angle
ß	Angle